UNIVERSITÄT BERN

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Study Design for the SNSF Career Tracker Cohorts (SNSF-CTC)

Final Report

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Table of contents

1. Introduction

The Swiss National Science Foundation (SNSF) aims to track and study the career paths of applicants to SNSF career funding schemes by means of “SNSF Career Tracker Cohorts (SNSF-CTC)”. The main goals are to monitor the careers of researchers and to identify the impact on the career development attributable to the career funding schemes of the SNSF (Postdoc.Mobility, Ambizione, PRIMA, Eccellenza). The SNSF has mandated the Institute of Sociology and the Interdisciplinary Centre for Gender Studies (ICFG) at the University of Bern to develop a detailed study design for the SNSF-CTC.

This report presents the study design for the SNSF-CTC including materials for the questionnaires. The proposed cohort study incorporates a panel design with regular monitoring and periodic in-depth surveys among all applicants to SNSF career funding schemes, such that successful and rejected applicants can be compared. Given the longitudinal design of the SNSF-CTC, this report presents elaborate versions of those questionnaires, which will be applied early on in the study. This includes the first in-depth questionnaire (the base questionnaire administered to the respondents between application and funding decision) and the early monitoring questionnaire in two versions (version A for successful and version B for rejected applicants; to be administered about one year after the base questionnaire), as well as materials for short modules to be added to single monitoring surveys. The contents of the subsequent surveys (i.e. the intermediate in-depth survey, the late monitoring surveys and the final in-depth survey) have already been drafted, but not elaborated because they will only be applied several years after the start of the study and adjustments may become necessary in the course of the study.

The structure of the report is as follows. Section 2 gives an overview of the SNSF career-funding schemes to be evaluated. The detailed aims of the SNSF-CTC are listed in Section 3. Section 4 presents the study design, including information about the participants and methods of data collection and analysis. The comparability of this study design to similar surveys is discussed in Section 5. Section 6 discusses the linkage with FSO data, and Section 7 presents suggestions regarding the implementation of the study.

2. SNSF career funding schemes

Apart from project funding, the SNSF provides funding schemes specifically designed to foster the careers of individuals at postdoc and assistant professor level. The characteristics of the four career funding schemes to be included in the SNSF-CTC are summarised in Table 1.

Table 1: Overview of the four SNSF career-funding schemes integrated in SNSF-CTC

Scheme	Target group	Specification	Duration
Postdoc.Mobility	Young researchers who have completed a doctorate and who wish to complete a study visit abroad and then pursue an academic career in Switzerland	Subsistence costs, flat-rate for travel expenses and a possible contribution to research, conference costs and matriculation fees; additional: return grant including salary and social security contributions	2 years (grant); additional 3-12 months (returning phase)
Ambizione	Young researchers from Switzerland and abroad who wish to conduct, manage and lead an independent project at a Swiss higher education institution	Salary of the grantee and project funds	Up to 4 years

Eccellenza	Highly qualified young researchers who aspire a permanent professorship	SNSF Eccellenza Professorial Fellowships: salary at the local rates applicable to assistant professorships as well as project funds of up to 1,000,000 Swiss francs; SNSF Eccellenza Grants: project funds of up to 1,500,000 Swiss francs	Up to 5 years
PRIMA	Female researchers from Switzerland and abroad who aspire a professorship in Switzerland	Salary and project funds, possibility to plan a stay at another host institution and the offer of a mentoring network	Up to 5 years

3. Aim of SNSF-CTC

The main objective of the SNSF-CTC is to gain a comprehensive view of the career paths of researchers funded by SNSF career funding schemes and of the career development attributable to SNSF career funding. This main objective can be broken down into three operational objectives and specific research questions:

- ➔ Mapping the career paths of SNSF grantees by tracking their employment status, employment conditions, speed of career, and achievements (e.g., scientific output). Research questions:
  - o How high is the retention rate in academic science and how does the rate depend on sociodemographic characteristics (e.g., gender, age, family status, etc.), discipline, type of grant, etc.?
  - o What are the reasons for leaving academic science?
- ➔ Comparison of SNSF grantees with non-grantees in terms of their career paths (see above). Research questions:
  - o In what ways do their career paths differ?
  - o What is the impact on a career both in and outside academic science attributable to SNSF funding?
- ➔ Comparing career paths of male and female SNSF grantees. Research questions:
  - o How large is the gender gap in research careers and how does it change over time?
  - o What are gender specific challenges regarding the career development of young researchers?

These objectives and research questions form the basis for the development of the study design and the questionnaires.

4. Study Design

The investigation of the research questions defined above involves many factors and requires a complex study design. The proposed approach comprises a panel design with a slim long-term monitoring on a regular basis and periodic in-depth inquiries.

For the description of the career paths of grantees, it suffices to collect data on applicants who are funded by the SNSF. To evaluate the significance of the career funding schemes for the careers of the grantees, however, the design requirements are disproportionately higher. As the grants are not randomly assigned, selectivity may cause bias in estimates of causal effects. Selection may occur with respect to application (researchers applying for SNSF career funding schemes are a non-random selection of all potential applicants) and with respect to grant decision (funded researchers are a non-random selection of all applicants). There are two possible strategies to approach these selectivity problems.

First, one can try to find specific settings in which it is highly plausible that no or only minor selectivity is present. Causal effects can then be identified based on observational data from such settings. Examples of such designs are instrumental variable approaches (IV) or regression discontinuity designs (RDD). The virtue of these designs is their high internal validity, given that appropriate settings can be found. The disadvantage is that the settings typically only apply to a small proportion of the population. On the one hand, this leads to low statistical efficiency (small sample sizes). On the other hand, generalisation of results is limited because causal effects are only identified "locally", with respect to small subpopulations that are potentially selective with respect to the direction and size of the effects (limited external validity).

Second, one can try to model the selection process in order to enable meaningful group comparisons. An advantage of such an approach is that one also gains information on the selection (i.e. treatment assignment) process itself, which is often of genuine interest. Furthermore, generalisation of results (external validity) is less problematic. The weakness of the approach is that internal validity is hard to establish. Results are only valid if all treatment assignment factors that are also related to the outcome are taken into account. If there are unobserved factors that affect both treatment assignment and outcome (e.g., motivation, talent) results will be biased.

We therefore propose to pursue two complementary identification strategies. On the one hand, we propose a regression discontinuity design in which successful and narrowly rejected applicants to the SNSF career funding schemes are compared. On the other hand, we propose to complement and validate the RDD results by a "synthetic" control approach, in which for each successful applicant a synthetic twin is constructed as a weighted average from rejected applicants based on background characteristics and information on their careers and scientific output prior to application.

Since data will only be collected on researchers who applied to one of the SNSF career funding schemes, both strategies only address selectivity with respect to grant decision, but not with respect to application. To be able to evaluate selectivity in the decision to pursue an academic career and apply for an SNSF career funding scheme, we further propose preparing the SNSF-CTC in a way such that linkage at the individual level is possible to other data sources collected by the Swiss Federal Statistical Office (FSO). Particularly interesting in this context are the Graduate Surveys by the FSO that include in-depth interviews with cohorts of Swiss PhD graduates every two years. Linkage and analysis of such additional sources will not be at the core of the SNF-CTC project, but it seems important to take all steps to make such analyses possible.

4.1 Participants

The study population comprises all applicants to the four SNSF career funding schemes Postdoc.Mobility, Ambizione, PRIMA and Eccellenza. Each year, a new cohort is launched (for Postdoc.Mobility there are two cohorts per year, one in spring and one in autumn; for all other funding schemes there is only one cohort per year). In each cohort, all successful applicants (treatment group) and all non-successful applicants (control group) will be included in the study. The evaluation data generated by the SNSF during the application procedure will provide key information for the implementation of the RDD approach and will thus be matched to the collected survey data. Applications to Postdoc.Mobility are evaluated in a one-stage procedure, that is, the decision is made solely based on the overall assessment of the SNSF Research Commission. Applications to Ambizione, PRIMA and Eccellenza are evaluated in a two-stage procedure, that is, an initial assessment by the SNSF Research Commission is used to make a shortlist of promising candidates, who are then invited for an interview and evaluated in more detail.

Because they appear uninformative from an RDD perspective, an option would be to exclude applicants from the study who have been clearly rejected based on the SNSF's evaluation. However, since all applicants have to receive a base questionnaire (which is administered before funding decisions are made) and since clearly rejected candidates are potential controls for the synthetic control approach, we advise against using this option and suggest including all applicants in the study. Furthermore, the rejected applicants may also be very informative for research questions addressing the causes and consequences of academic career failure.

4.2 Data collection

4.2.1 Surveys

The panel approach of the proposed study design consists of standardised monitoring surveys and in-depth surveys at given points in time (see Figure 1). After the application – and before notification of the funding decision – all applicants receive the *first in-depth survey* (base questionnaire). Given the different application deadlines of the individual career schemes, the first in-depth survey is sent out at different dates during the year depending on the funding scheme. Following this first wave, short *early monitoring surveys* are sent out once per year starting in the year after application until the end of the funding phase. After the approximate end of the funding phase, all participants receive an *intermediate in-depth survey*. Instead of triggered surveys at individual times of completion, all participants receive the survey at the same time (depending on funding scheme) to increase the comparability. Thus, the intermediate in-depth survey is sent out after 2 monitoring surveys (i.e. as the 4th interview including the base questionnaire) for Postdoc.Mobility, after 4 monitoring surveys for Ambizione, and after 5 monitoring surveys for PRIMA and Eccellenza. After the intermediate in-depth survey, all participants again receive short *late monitoring surveys* each year. The *final in-depth survey*, which marks the end of the panel, will be administered 5 years after the intermediate in-depth survey, that is, after 4 late monitoring surveys. Non-successful applicants are interviewed according to the same scheme, with slightly different questionnaires to take account of their different situation.

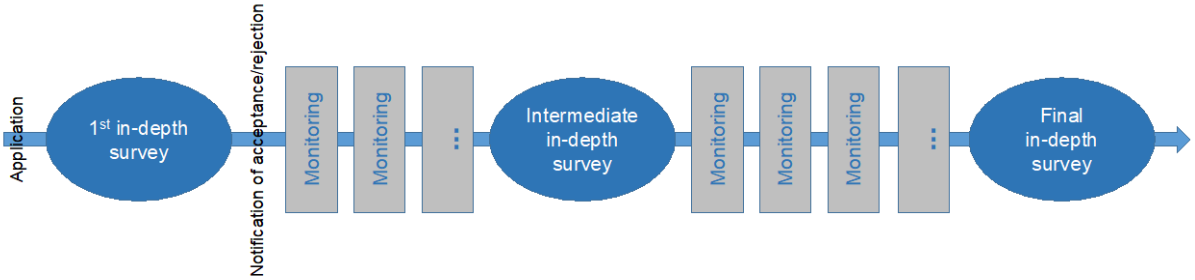

Figure 1. Sequence of surveys

The monitoring surveys mainly serve to track the career development and changes in the life situation of the respondents. By means of the three individual in-depth surveys, additional topics can be covered that do not require regular monitoring but provide essential information for the research objectives (e.g., retrospective information about doctorate in the base survey).

The regular (early and late) monitoring guarantees full traceability of the applicants' career paths after their application and helps reducing the length of the individual surveys. At the same time, frequent surveying prevents panel

attrition (i.e. the phenomenon that people drop out of the panel because contact is lost). In order to further improve the response rate, offering vouchers or charity donations may be a means to consider.

4.2.2 Administrative Data

Apart from the above-mentioned proposal evaluation data, further detailed information is collected by the SNSF during the application process. This includes personal data of the applicants such as gender, birthdate, place of residence, nationality, etc., as well as administrative data such as information on prior SNSF funding, duration and budget of the grant, staff, information on supplementary measures etc.[1] These data sources will be processed and merged with the survey data. Moreover, the p3 database of the SNSF provides information on projects, persons, and publications that can be linked to the survey data. A disadvantage of this database, however, is that its content is managed by the researchers themselves and can therefore be fragmentary. Whether the p3 data, or parts of it, prove useful for the SNSF-CTC will be evaluated at a later point in time when preparing data analyses. At the same time, it should be evaluated whether measures of academic performance can also be extracted from alternative data sources such as Web of Science or Google Scholar.

4.3 Development of survey questionnaires

The questionnaires for the SNSF-CTC were developed in accordance with the research questions formulated in Section 3 and based on evaluations and instruments of other surveys with similar objectives. The material mostly relied on for this purpose were the following surveys and reports: the Graduate Survey of the Federal Statistical Office (FSO, 2016); the reports for the pilot study and the 2017 career tracking study of doctorate holders by the European Science Foundation (ESF, 2015; ESF2017); the questionnaires of MERCI (Monitoring European Research Council's Implementation of Excellence) (Huber, Wegner & Neufeld, 2015); the Wellcome Trust Basic Science, the evaluation of the "Bundesprogramm Chancengleichheit von Frau und Mann an den Universitäten" (Dubach et al., 2012) and Career Tracker (Wellcome Trust, 2015); and of ProFile – Doctoral Candidates Panel (Tesch, 2015; IFQ, 2015). Consulting the instruments and evaluation reports of these surveys, among others, we collected topics and questions as potential material for inclusion in the SNSF-CTC surveys.

In a next step, the collected material was presented to the SNSF working group, whose members were asked to provide priority ratings (1-6) for the different topics and questions. Based on these priorities and on the operational objectives defined in Section 3, we then selected the topics and questions to be part of the surveys. Questions with a low priority, that is with a mean rating below 4, were excluded and those just above this margin where weighed in terms of the operational objectives. This process allowed to reduce the catalogue of questions to a core set of topics with high priority. These topics were the following: demographics and personal information, reasons for application, information about the current employment, retrospective information (e.g. on doctorate, employment history), career prospects and aspirations, networking and mentoring, family situation and care responsibilities, as well as satisfaction and problem areas. Focusing on these topics, we built questionnaires with specific questions and answer options. All questionnaires are in English. The questions and answers were phrased both with regard to the main objectives of the study and following formulations used in questionnaires designed for similar purposes (see above). In two further feedback rounds, adjustments were made mainly with regard to the following aspects. The single question concerning the reason for application was discarded, because the information gain was not considered crucial for the purpose of the study. The series of questions regarding retrospective information on the professional

[1] Furthermore, the SNSF has plans to establish a management system for standardised CVs. Once such a system is functional, its data should be integrated into the SNSF-CTC such that survey burden imposed on respondents can be minimised.

career development (e.g. employment from the time of completion of the doctorate/PhD until the application for SNSF career funding) were simplified, given that a detailed account may consume too much time and may be too complex. Instead of an event history calendar with a chronological calendar grid (Morselli, Le Goff, & Gauthier, 2018) for full and detailed traceability of the career development, the first in-depth survey now elicits crucial information by means of simple questions about specific situations of interest. This concerns periods when respondents were employed as researchers or as non-researchers and periods in which the respondents were not gainfully employed. The questions concerning career prospects and aspirations have been included in the monitoring surveys as well (instead of just the first in-depth survey), given that tracing personal aspiration may reveal interesting insights over time. The series of questions on the respondents' personal and family situation were complemented by questions on the household situation and the distribution of domestic work. In addition, particular themes and questions were designed for single modules, which can be added to monitoring or 2nd and 3rd in-depth surveys at appropriate and convenient times. These are themes, which do not require regular inquiry but are still informative to the goals of the SNSF-CTC. They include the respondents' attitudes towards academic career, their satisfaction with the current work situation, situations of dual career couples, accounts of gender specific discrimination, information on mentoring activities and the respondents' research network. Note that the module questions are preliminary given that they will only become applicable at a later stage in the study and may be subject to change.

Table 2 provides an overview of the agreed main themes inquired in the surveys. The table also provides information on the timing of the data collection for the different themes.

Table 2: Themes and timing

Theme	Time of inquiry
Demographics and personal information	1st in-depth survey
Information on doctorate/PhD	1st in-depth survey
Retrospective employment information (career since doctorate)	1st in-depth survey
Current employment (status, institution, responsibilities etc.)	In-depth surveys and monitoring
Information on periods without gainful employment	In-depth surveys and monitoring
Career prospects and aspirations	In-depth surveys and monitoring
Information on academic career progress (publications etc.)	2nd/3rd in-depth surveys and monitoring
Reasons for leaving academic science	2nd/3rd in-depth surveys and monitoring
Family situation and care responsibilities	In-depth surveys and monitoring
Opinions about academic careers	One-time module
Satisfaction with work situation	One-time module
Situations of dual career couples	One-time module
Gender specific discrimination	One-time module
Mentoring	One-time module
Research network	One-time module

4.4 Data analysis

Descriptive analyses (objective 1 and 3) are straightforward and require no elaboration here. Data analysis for objective 2 will have to rely on state-of-the-art techniques of causal analysis (e.g., for RDD data, or for matching on observables in case of the synthetic control analyses). There is a large body of modern literature in this area, but the field is still moving fast. Since it will take several years until the first SNSF-CTC data for these types of analyses become available, the details of the data analysis will have to be elaborated based on the state of the literature at that time.

An important aspect with respect to objective 2 is statistical power. Given that the number of yearly applicants to the different funding schemes is only moderate, a question is whether statistical power will suffice to draw meaningful conclusions from the collected data. Table 3 provides an overview of the number of applicants by funding scheme for the past few years.

Table 3: Number of successful and unsuccessful applications by funding scheme, 2014–2016

Funding scheme	Applications	Funded			Rejected		
Postdoc.Mobility		A	AB	B	B	BC	C or lower
– 2014	238	31	76	6	56	47	22
– 2015	323	52	103	1	81	60	35
– 2016	351	53	83	0	134	56	25
– Total	921	136	262	7	271	163	82
Ambizione					2nd stage		1st stage
– 2014	360		67		27		266
– 2015	402		71		25		306
– 2016	289		89		41		159
– Total	1051		227		93		731
Eccellenza (Förderprofessur)					2nd stage		1st stage
– 2014	259		40		35		184
– 2015	254		40		35		179
– 2016	264		41		34		189
– Total	777		121		104		552
MHV / PRIMA					2nd stage		1st stage
– 2014	152		36		15		101
– 2015	140		39		17		84
– 2016	151		42		15		94
– Total	443		117		47		279

We now provide results from some basic power analyses to get an approximate idea of the results that can be expected from the SNSF-CTC. Assume we are interested in whether applicants attain a professorship after some years. For Ambizione, Eccellenza, and PRIMA we set this rate to 80% for successful applicants and then vary the rate for unsuccessful applicants between 50% and 79%. For Postdoc.Mobility we set the rate to 40% for successful

applicants and vary the rate for unsuccessful applicants between 10% and 39%. Furthermore, we assume a significance level of 5% and use two-sided tests.

Results of the power analysis for Ambizione, Eccellenza, and PRIMA are displayed in Figure 2. If we only use stage 2 applications (i.e. funded applications and close rejections; solid lines) we see that power is above 80% for effect sizes of 10 percentage points (e.g. 70% vs. 80% who attain a professorship) or more. If we use all applications (dashed lines), power is considerably higher, but a comparison between successful and unsuccessful applicants might be less valid due to selectivity bias. If we only focus on a single instrument, effect sizes for the stage 2 sample have to be in the order of 15 (Ambizione), between 15 and 20 (Eccellenza) and close to 25 percentage points (PRIMA) even if we pool the three cohorts. Power thus seems to be sufficient to identify effects of the schemes if the effects are substantial (> 10 percentage points) and if several cohorts and schemes are pooled together. However, power to draw conclusions about effect differences between the three schemes will be low unless more than three cohorts can be observed. Also note that these analyses assume that the outcome (whether a professorship is attained) can be determined for all applicants; if there is non-response and panel attrition, power will be lower.

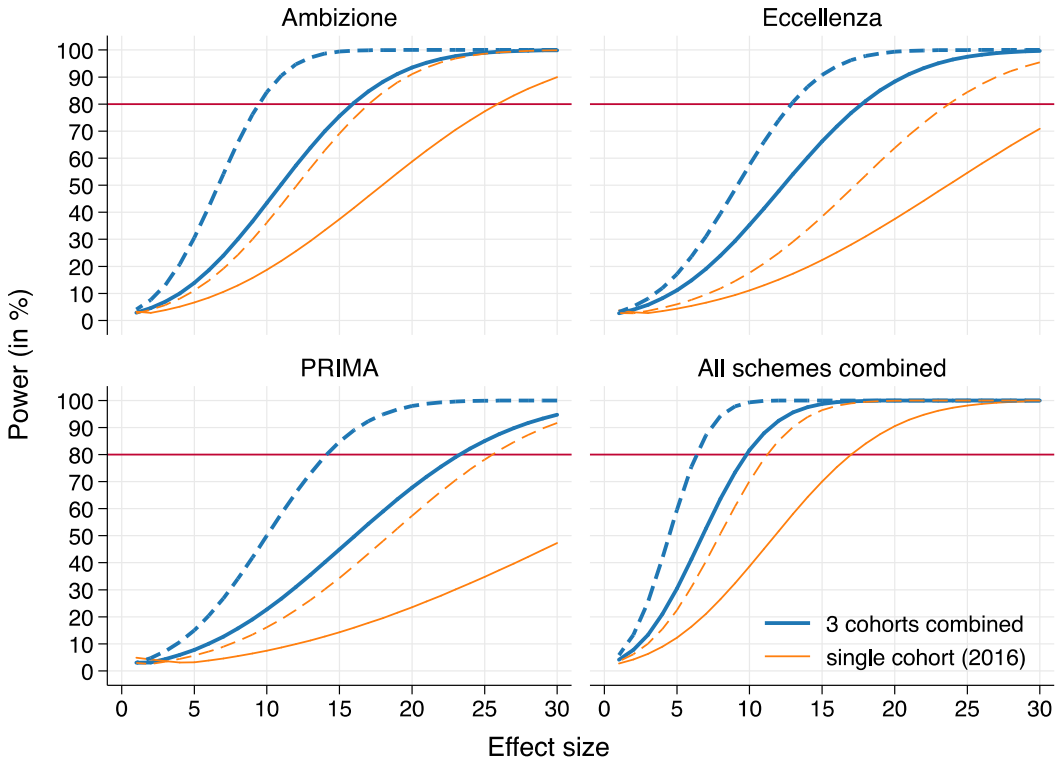

Figure 2. Power analysis for Ambizione, Eccellenza and PRIMA (solid lines: stage 2 applications only, dashed lines: all applications)

Figure 3 presents an equivalent analysis for Postdoc.Mobility, but with different assumptions about the proportion of applicants who attain a professorship. Under these assumptions, if using the narrow sample (AB and funded B vs. rejected B) pooled over three years, the effect size has to be about 12 percentage points (28% vs. 40% who attain a professorship) to reach a power of 80%. For a single cohort, the effect size would have to be close to 20 percentage points.

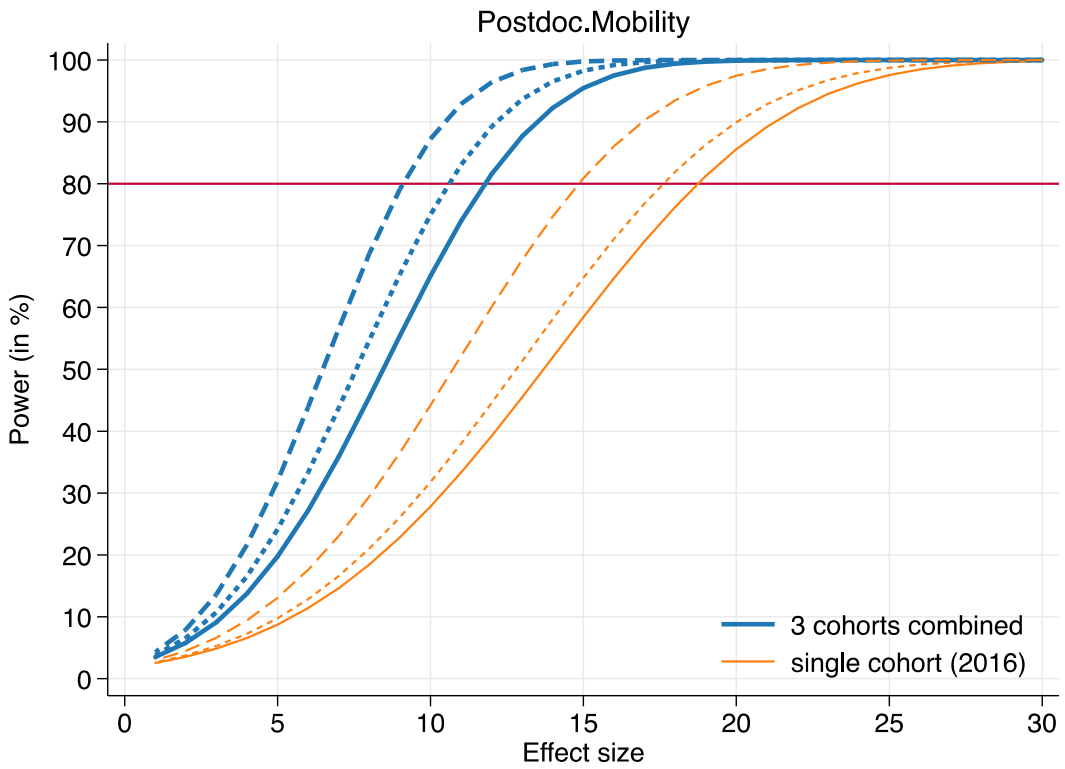

Figure 3. Power analysis for Postdoc.Mobility (solid lines: AB and funded B vs. rejected B; dotted lines: AB and funded B vs. rejected B and BC; dashed lines: all applications)

4.5 Ethical and data protection issues

The questionnaires are designed in a sensitive manner, such that they respect the dignity and personal privacy of the individuals. When implementing the surveys, it must be secured that the questionnaires contain a text passage informing the participants about the purpose of the study in plain language statements before they fill out the questionnaires. Moreover, the participants must be assured that their information will be handled strictly confidentially and that the data will be anonymised for analysis. Of particular importance for the quality of the survey data is to make clear to the respondents that their answers will not be fed back into the admin data of the SNSF. However, to be able to link SNSF admin data and other data, e.g. from the FSO, for purpose of analysis, a passage asking for consent regarding such linkages may be necessary (such a question would most likely have to be added to the end of the first in-depth questionnaire).

Given that the Human Research Act does not apply to the designed study based on the definition of the act, further clarifications with a governmental ethics committee are not considered necessary. Nonetheless, it may make sense to obtain an evaluation by a research ethics committee of a Swiss university.

5. Comparability to other studies

The aims of this study are in line with objectives of career tracking studies and grant evaluations of funding institutions in other countries, although the specific foci vary between studies. For example, the MERCI project focuses on the funding strategies of Starting Grants (StG) applicants and their motives to apply, on the selection process,

experiences of StG recipients with their host institution and their working conditions, and on the outcome and sustainability of the StG funding[2]. The key themes of the Wellcome Trust Career Trackers, on the other hand, are career destinations in academia and outside academia, career motivations and intentions, as well as support and mentorship[3]. The ESF survey on doctorate holders inquires virtual, physical, sectoral and occupational mobility as well as research outcomes, roles and responsibilities, competence development, and skills utilisation[4]. The study design at hand follows these instruments among others (cf. Section 4.3). The possibility to further harmonise the developed surveys with similar instruments is thus not precluded. Regarding future exchange and potential collaborations the SNSF project team has been in touch with the persons responsible for the Study on Career Impacts of ERC Funding and the Wellcome Trust. Additionally, an exchange with the newly established nacaps (National Academics Panel Study) in Germany was established by the Institute of Sociology.

6. Linking with FSO data

As discussed at the meeting of the project team and the SNSF working group in November 2017, there is a possibility of matching the data obtained from the SNSF-CTC with data from the Graduate Survey as well as the LABB (Längsschnittanalysen im Bildungsbereich) of the FSO. There is great readiness by the FSO to support a future project of data matching. Combining these datasets would greatly enhance the analytical potential. Especially, research questions concerning early careers and selection into academic careers (funded by the SNSF) could be analysed.

To prepare such a linkage between the SNSF-CTC and data collected by the FSO, social security numbers of applicants have to be determined. The procedure is as follows: For each cohort of applicants, the SNSF (or the research team managing the SNSF-CTC) sends a dataset containing a unique identifier (SNSF-CTC ID), family name, first name, birth date, and gender to the FSO. The FSO will then establish a link to their registry and keep a look-up table between SNSF-CTC IDs and social security numbers (AHVN13). At a later point in time, FSO data can be requested for analysis by sending a list of SNSF-CTC IDs to the FSO, who will then compile the requested data with the help of the look-up table and send back a dataset containing the SNSF-CTC IDs and the requested data. At no point will the AHVN13 leave the FSO.

Based on experience with similar projects, the FSO estimates the proportion of applicants who can be matched to be above 95% (among those who do have an AHVN13). The matching quality can be further improved if additional information is delivered to the FSO (such as nationality, place of birth, or names of parents). Applicants who have no prior history in Switzerland will not have an AHVN13; it might therefore be necessary to update the look-up table from time to time to include such applicants once they have moved to Switzerland.

The FSO is willing to support the SNSF-CTC project and conduct linkages according to the procedure described above (personal communication with Markus Schwyn from FSO). The linkage work can also be carried out by a member of the SNSF-CTC research team, given that the member travels to the FSO to conduct the work in place.

[2] http://www.forschungsinfo.de/Publikationen/Download/working_paper_16_2015.pdf

[3] https://wellcome.ac.uk/sites/default/files/wtp059281.pdf

[4] http://www.esf.org/fileadmin/user_upload/esf/Career_Tracking_Pilot_Report_2015-05-28.pdf

7. Suggestions for next steps, implementation, data management

7.1 Technical and scientific implementation

The surveys are designed in a way such that they can be easily implemented in online data collection tools. Using such a tool is recommended as it reduces time and effort for the respondents as well as for the researchers. The tool used for this study must allow for dynamic panel data collection, meaning that subsequent questionnaires can revert to respondents' information of previous surveys. Implementing dynamic questionnaires considerably reduces efforts for respondents. Furthermore, the tool should support a responsive design such that the questionnaires can be completed on mobile devices. The choice of a suitable tool has to be discussed with the external institute who will administer the survey, and who will also have to clarify further technical details (e.g., dynamic integration of job-titles database etc.).

In the course of the study, the project team will be responsible for the further development and testing of the materials, scientific supervision of processes, data administration, data analysis and reporting of results. The responsibilities regarding organisation and coordination, especially regarding data collection with the external institute, are yet to be clarified.

7.2 Pre-tests

Before the start of the first cohort, the questionnaires should be pre-tested to check and – if necessary – improve the content and implementation of the surveys. First, cognitive pre-testing allows for the collection of useful information on how participants respond to the survey (e.g., how they interpret the questions and form their answers, how long they take to complete the survey, whether they face difficulties answering the question, etc.) and whether the questions asked serve the intended purpose. We suggest a pre-test with approximately ten individuals (theoretical sampling: selection based on predefined criteria to balance disciplines, gender etc.), who have recently applied to one of the four SNSF career funding schemes or who have received funding. Based on the evaluation of the cognitive pre-test, the questionnaires can subsequently be adjusted, for example with regard to wording or length before the implementation. Second, once the questionnaires are programmed, a technical pre-test using simulated respondents serves to check the functions and identify potential technical errors. Finally, it cannot be ruled out that further adjustments to the surveys will prove necessary once the first cohort has been launched and the first surveys are applied. Therefore, the first cohort may serve as a test cohort. This does not mean that no results can be obtained for the first cohort. However, changes in the instruments may become necessary based on the experience with the first cohort. As a consequence, the first cohort's results may not be fully comparable to results from later cohorts.

7.3 Schedule outline

To ensure a successful start of the study, the implementation needs to start well in advance of the first survey wave, given that programming and pretesting of the material is time-consuming. Ideally, the organisation of the implementation, including the cognitive pre-test, starts in May.

A rough outline of important dates and tasks is presented in Table 4. The start of the first cohort is planned for autumn 2018 with Postdoc.Mobility, followed by Ambizione and PRIMA in winter 2018 and Eccellenza in spring 2019. The 1st in-depth survey shall be sent out to the applicants after the application deadline, a few weeks before funding decisions are made, to allow for enough time to complete the survey (including a reminder for participation)

before the applicants receive the decision notifications. After each survey, a few months will be necessary for the preparation of the data and the analyses. We suggest yearly reports covering all funding schemes together, to allow for convenience and a good overview. The first reporting phase for all funding schemes would realistically take place roughly in September/October 2019.

Table 4: Start of first cohort per funding scheme 2018/2019

Scheme	Application	1st in-depth survey	Data preparation and analysis	1st reporting
Postdoc.Mobility	1 Aug. 2018	Nov. 2018	Feb. 2019 – May 2019	Sept./Oct. 2019
	1 Feb. 2019	Mar. 2019	May 2019 – Aug. 2019	Sept./Oct. 2019
Ambizione	1 Nov. 2018	Dec. 2018	Feb. 2019 – May 2019	Sept./Oct. 2019
PRIMA	1 Nov. 2018	Dec. 2018	Feb. 2019 – May 2019	Sept./Oct. 2019
Eccellenza	1 Feb. 2019	Mar. 2019	May 2019 – Aug. 2019	Sept./Oct. 2019

If the procedure outlined above is realised successfully for the first cohort, it can be adopted as such for the subsequent years. In the first half of 2020, the monitoring surveys will start, with the first monitoring survey being administered to the 2018 applicants of Postdoc.Mobility. Further monitoring surveys will be planned periodically. The results of the individual monitoring surveys will also be integrated in the yearly reporting.

7.4 Reporting

We propose two types of reports: A relatively concise yearly report that mostly covers descriptive statistics, as well as more in-depth reports, analysing particular themes, about every 3-4 years.

The yearly report would provide information on the state of the data collection for each of the four schemes (Postdoc.Mobility, Eccellenza, Ambizione and PRIMA), a description of the data and statistics on the schemes such as, for example, number of applications, proportion of successful applicants by certain characteristics (socio-demographics, disciplines, type of doctorate, etc.). Further, the labour market situation of the respondents with and without SNSF funding will be covered, as well as their early career advancement. Here the focus will be, for example, on the academic performance of funded applicants, on whether applicants without funding left academia, as well as key factors such as the occupational position or income.

In-depth reports will be provided as soon as data collection is being sufficiently advanced. They will cover several topics and allow for conceptually and methodologically more elaborate analyses. They will be divided into two parts, the first covering the situation before and during SNSF funding (if successful) and the second, covering the years after the end of the SNSF funding. Key themes in the first part could be the analysis of the determinants for successful applications using joint SNSF and FSO data. The role of factors such as international mobility, previous grants, publication record, career aspirations etc. will be of central interest. Further, gender differences in early academic careers or the impact of the family situation will be part of these reports. In the second part, longer career trajectories can be observed and be compared between respondents who remain in academic science and others who move on into different careers in the private sector or the public administration. A key theme in this part will be the analysis of the effects of SNSF career funding on retention rates, reasons for dropouts and, for example, the probability of becoming a full professor.

7.5 Data management

Given the nature of the collected information, the survey data obtained from the SNSF-CTC participants should be considered as research data. It should be treated confidentially and analysed anonymously. This implies that the collected survey data should not be fed back into the administrative database of the SNSF. A linkage between SNSF admin data and the survey data is necessary for the purpose of data collection (in the sense that admin data is used to establish contact to the respondents and to design targeted questionnaires) and for the purpose of data analysis (since the admin data provide additional information that is not collected in the surveys). However, the SNSF-CTC data should remain independent from the administrative processes of the SNSF. We therefore propose to use a separate respondent ID in the SNSF-CTC that is different from the applicant ID maintained by the SNSF administration. The two data sources can then only be linked by means of a look-up table that matches the two IDs. This look-up table will be kept separately from the SNSF-CTC dataset containing the survey data and access to the table will be restricted to the SNSF-CTC project management. Likewise, the survey data will not contain any other personal identifiers such as names or birth dates.

Against the backdrop of the Open Data initiative and to foster a wide scientific usage of the SNSF-CTC data, we also encourage issuing anonymous scientific use files that can be made available to other researchers through services such as FORS.

7.6 Project management

For the project management we see two different conceptual setups that might be viable. In the first setup, the project management remains at the SNSF and the implementation of the surveys (programming of the questionnaires, contacting the respondents, collecting the data, preparing and documenting the data) will be contracted out to an external survey institute. After that, data analysis and reporting would probably have to be contracted out, at least in part, to an academic research team. In the second setup, project management is transferred to an academic research team, who will oversee the work of the survey institute, be responsible for data preparation and documentation, data analysis, and reporting. The second setup appears more appropriate to us because the work packages would be less detached and a better overall planning and smooth integration of the different elements of the project could be achieved. In particular, a close collaboration between the researchers designing the study and analysing the data, and the survey institute collecting the data can be highly beneficial. Furthermore, in such a setup, less work would have to be contracted out to a survey institute since more tasks, such as data preparation, could be done in-house by the research team. This would be more efficient since less coordination between different parties is necessary. Furthermore, credibility of the project as an independent and impartial evaluation and monitoring of the SNSF career funding schemes would be easier to establish.

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